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NOTES OF OBSERVATIONS

OF

INJURIOUS INSECTS.

3rd

REPORT, 1879.

LONDON:

W. SWAN SONNENSCHN & ALLEN,
15, PATERNOSTER SQUARE.

—
1880.

Price One Shilling.

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W. H. A. J.
U. S. DEPARTMENT
OF AGRICULTURE

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NOTES OF OBSERVATIONS
OF
INJURIOUS INSECTS.

REPORT, 1879.

IN 1878 it appeared from the observer's notes that a moist and mild winter had been followed by luxuriant vegetation, and unusual absence of any great amount of insect damage. This season the case has been different. The weather characteristics of the observer's year, beginning with November, 1878, have been temperature below the average, and rainfall above the average, with little sunshine; and the returns show insect attack fully up to the usual amount, and insect presence often exceeding it. The unusual cold of the winter and the depth to which the frost penetrated the ground do not appear to have acted prejudicially on larvæ subjected to them, either at the time or in subsequent development; and the only cases in which the weather appears notably to have had effect in ridding us of insect attack is where the persistent rainfall or the tremendous downpour of summer storms have fairly swept the insects from the plants, or in some cases of leaf-feeders, where the plant-growth has (conjecturally) been driven on past the power of the larvæ. With regard to the precise temperature I have received only a few notes, but they may serve as a general guide.

At the Manse of Shandwick, Orkney, the lowest temperature in shade was $15^{\circ}\cdot4$, the lowest on grass $9^{\circ}\cdot5$; these on January 2nd.

Speaking generally, the frost during the past winter appears to have penetrated in Scotland about the depth of one foot into the earth. At Dalkeith it reached a depth of fifteen inches; and in Perthshire it is stated to have penetrated twenty to twenty-four inches. Mr. Service, writing from Maxwelltown, Dumfries, mentions

that from examination of the Meteorological records it appears that December, 1878, and January and February, 1879, were 9° below the average of the last 115 years: the soil was frozen to a depth of from twelve to twenty-one inches from December 4th till the middle of March; April and May were dry and cold; and the remaining months until the beginning of November were cold and rainy to an unusual—and, as far as known, unprecedented—degree. At Sparham, near Norwich, the lowest temperature of the winter was 3° in the low-lying part of the parish, and 10° on the high ground, on December 25th. At my own station at Isleworth the lowest temperature was $10^{\circ}\cdot5$; the lowest observed on grass was $9^{\circ}\cdot8$ on January 12th. The earth temperatures at one foot deep sunk to between 32° and 33° from December 24th to the 29th, and also from January 12th to February 6th.

An idea being prevalent that “cold kills the grubs,” I took the opportunity whilst the great cold lasted of examining the state of all larvæ and pupæ I could find fully exposed to its influence, whether unsheltered, under bark, or in frozen ground, and found that in all cases, even where the earth was frozen so hard that the mass had to be broken up with a hammer, and the larvæ or pupæ were perfectly rigid, that on thawing they did not appear to be in any way injured; and in the case of the larvæ of the Cabbage Weevil (which was the only instance in which any immediate action was to be expected) they continued the operation of making their earth-cases for pupation (as is usual with this grub on disturbance from the gall) as if nothing had happened. Of these observations I give the details under the headings of the respective insects.

In other respects the extreme severity of the winter was favourable to insect preservation, as large numbers were secured from bird attack under the snow or in the frost-bound ground; and also the excessive cold (as shown by the Phenological Report of the Meteorological Society) caused an almost unprecedented mortality amongst the birds; this especially noted amongst the *Turdidæ* and Starlings. The cold and wet spring subsequently retarded the nesting season, and further diminished the ordinary amount by the great numbers of eggs that were addled.

The general returns do not show that any kind of injurious insect has been lessened in amount of appearance by the winter cold, excepting (possibly) the Turnip Fly. This has been little prevalent, but (conjecturally) this is rather owing to failure of the Turnip crops than direct weather influence, as noted in the return: “No Turnips, therefore no Fly.”

Amongst the Lepidoptera some of the injurious kinds have been excessively plentiful in various localities, as also the surface caterpillars. Amongst Coleoptera the weevils of various species have not failed us, neither have the injurious Diptera. The Crane Fly larvæ have fairly ravaged various localities, and the Carrot Fly and Celery Fly have played their part, whilst the Onion Fly has been particularly hurtful in the Isle of Mull. Great injury in many places from the Gooseberry Sawfly, and locally from other species, as also the appearance of *Cynips Kollari*, "like a scourge," at the Glen, Tipperary, and (though Wasps and Honey Bees appear to have been respectively less present or less productive than usual) the great abundance of some species of Humble Bees in the spring, show that the Hymenoptera survived; and on the whole it certainly cannot be said that the cold of last winter has diminished the amount of insect presence in the summer.

Before giving the year's notes it now remains for me to offer, on the part of my colleagues and myself, our hearty thanks to our contributors. In the full conviction that such information cannot fail to be of general service, we feel much indebted to those who allow us to be the means of making it known.

For the coming year it is with great pleasure that I am able to say that, besides many of our original observers, many have come forward, especially in Scotland, amongst the leading foresters and horticulturists, who are well qualified to bestow sound information, and have promised their contributions. Any notes, whether as to amount of insect injury, estimated loss (pecuniarily) from this cause, and, most especially, remedies found of practical use in checking it; also any notes of coincident circumstances, such as of weather influences, or surroundings, or state of the soil, which may increase or diminish insect attack, will all be of service, and gratefully received. Even the shortest notes, possibly thought of little use by the observers themselves, are of value when collated with others; and I should be glad to draw attention to the importance of noting down the observations when they occur: such incidents as the first appearance of the insects, the date at which they are most numerous, and their disappearance, are very apt to slip from the memory if not noted at the time.

With the Report of this year a new observation sheet is forwarded to the contributors, in which many additional insects are recommended for observation, but all in the strict sense of the term injurious, and for convenience of reference are arranged under the heads of the crops which they most commonly attack. The numbering of the list being

necessarily altered, I now give this year's Notes in accordance with those on our new sheet.



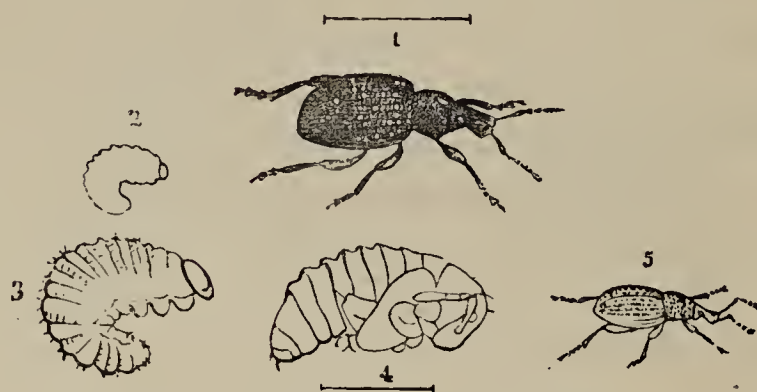
PLUSIA GAMMA.

1. **Plusia Gamma.** Silver Y Moth. The unusual amount of appearance of this moth has been as remarkable as that of the *Colias Edusa* in 1877; and as we rarely are enabled to trace the march of one of these vast insect appearances forward, I take leave to offer a note, which has been forwarded to me by Mr. Fitch, of Maldon, of the progress of the swarm, which appears to have been composed, at most of the successive points noted, of the moth *Plusia Gamma*, as well as of the Painted Lady butterfly, *Vanessa Cardui*. The swarm appears to have started from the North-west of Africa and travelled in a north-east direction, was observed at Algiers about April 15th to 20th, it reached Valencia, and was spread over Spain, and also present in the Balearic Isles from April 26th to May 3rd, and crossed the Eastern Pyrenees on May 26th and 27th. It next appeared in the South-east of France, Switzerland, and Northern Italy; and on the morning of June 5th thousands of living specimens were found on the snow at the Hospice of St. Gothard. It was then distributed over Germany and Austria at dates of appearance noted as being from June 7th to 16th. Another column crossed the Mediterranean to Sicily, and spread northwards over Italy in June. The more westerly end of the migratory swarm reached Strasburg from June 3rd to 9th; Paris and its environs were apparently not reached till June 15th. The appearance on our South coast was noticed on June 10th; and the moths were subsequently observable throughout the three kingdoms. Mr. Norgate mentions the *Plusia Gamma* as unusually abundant at Sparham, near Norwich, on June 12th and 13th; and it was also noticed on the 13th at Maldon, Essex. Subsequently it occurred in enormous quantities at many localities, the numbers, however, diminishing (as far as appears from the observations sent in) as the points of observation became more northerly. At Exeter, Mr. Parfitt mentions

that he never saw anything to be compared with its numbers: towards the end of September the larvæ literally swarmed on every garden plant, defoliating the plants, as well as riddling the leaves. Mr. Anderson, writing from Chichester, mentions that serious injury was caused by the larvæ of the *Plusia Gamma* to the field Peas, whole fields being stripped of their leaves, and the growth of the pods consequently checked. On August 5th great numbers of the larvæ were collected; two days later they spun up, the moths developing on the 14th, the pupal state thus only lasting a week or ten days. Mr. Anderson also mentions the large flocks of the Common Song Thrush, which congregated in vast numbers, and did good service in clearing the larvæ. At Addington, Bucks, Mr. Matheson observes the moth as much more abundant than usual; and at Isleworth it was noticeable in large numbers (though not in the great swarms mentioned in other localities) about August 10th. The moth was also noticed as exceedingly abundant in the New Forest, Hants, at the end of August and beginning of September; and very numerous likewise at Ashford, Kent. At Maldon, Essex, Mr. Fitch mentions the occurrence of the moth in the greatest profusion about the middle of August, the larvæ also being very numerous, but destroyed in immense numbers by the persistent downpour of rain before they had time to effect serious damage. At Tranmere, near Birkenhead, Cheshire, Mr. Willoughby Gardner gives the appearance of the *Plusia Gamma* as greater than he had seen it in previous years, but not as in such swarms as in many parts of that county in the present season; and at Huddersfield, in Yorkshire, a little farther north, Mr. Mosley mentions it as having been more numerous than usual, but not so much so as it appears to have been in the South. At Maxwelltown, Dumfries, Mr. Robert Service observes "we had no unusual abundance of *Plusia Gamma*, such as was observed elsewhere." With regard to the destructive powers of the larvæ of this moth, where they make good their hold, it may be allowable to give a note (although it is not an English observation) from the statements (quoted in the 'Times' newspaper of November 12th, p. 6, col. 1) made at the previous meeting of the Society for the Promotion of Sugar Beet Industry, at Halle. "Before the appearance of the moth and caterpillar the Sugar Beet crops in Saxony were in excellent condition, and would in ordinary circumstances have yielded a harvest of from nine to ten tons per acre; the actual yield where the caterpillars had been was only three tons."

2. *Otiorhynchus* (sp. *sulcatus* and *picipes*). The *Otiorhynchus picipes* appears to have been present in unusual numbers during the

two past seasons in the South-west of England. Mr. John Thomas, of Ridgeovean, Gulval, Cornwall, in a communication forwarded through Mr. D'Urban, of Exeter, notes a severe attack of these



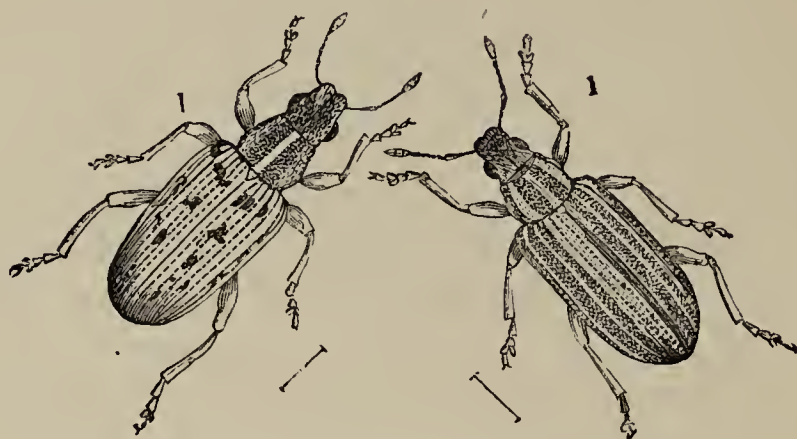
OTIORHYNCHUS (sp. SULCATUS and PICIPES).

Weevils, in 1878, in his Raspberry gardens, which extend over two acres of land. The whole of the Canes were stripped of their shoots, and the crop consequently sacrificed, causing a loss of upwards of £100. In the present year, 1879, Mr. Thomas, on examination of his Raspberry bushes at night, found the brown Weevils gnawing through the succulent stems of the blossom-shoots, some consequently withering, some being cut right off. At the approach of daylight the Weevils went down to the ground and hid themselves just below the surface, or underneath stones. Hand-picking, strewing the ground with lime, and daubing the feet of the Canes with coal-tar, were tried as remedies, but found to be either insufficient or useless. Mr. Thomas had then a number of wooden trays constructed, the inside of which was smeared all over with tar. The Raspberries are planted in clumps and bent into arches: after dark one man held a tray beneath an arch, another carrying a lantern gave the bush a smart tap, and the Weevils fell into the tray; the tar held them prisoners for a time; and after the tray had been placed under a bush or two the Weevils collected were killed by pouring boiling water over them. It was found necessary that the water should be quite boiling to effect this thoroughly. Mr. Thomas had thirty or forty persons at this work on his grounds, and each bush was treated three times in this way. An immense number of Weevils were caught, estimated at hundreds of thousands; and it was hoped by continuing this plan to avoid much future loss. Raspberry grounds at Pleming, Polgoon, and Ponjou, were mentioned as similarly attacked; and in 1878 Raspberry plots in the large fruit gardens in Gulval and in part of Madron (also in Cornwall) were almost totally destroyed, at a loss of many hundred pounds. Mr. D'Urban mentions the presence of a considerable number of the

Otiorhynchus picipes on his Raspberries at Exeter; but by the use of a sweeping-net after dark, during the month of June, he prevented any but slight injury from the attack. Mr. Clapham observes relatively to *Otiorhynchus sulcatus*, which had been exceedingly numerous in his garden at Scarborough, that on taking up his Primulas (800 to 900 in number) very few of the Weevil grubs were found, and only a limited number of the perfect Weevils were observed during the season. This he considers may be partly attributable to the seedlings being planted in fresh earth, partly to the excessive rainfall, but mainly he believed to the presence of Hedgehogs, whose services had been of much use in clearing off the plague of Slugs, and he considers had also destroyed the Weevils. Mr. Rolfe notes the *O. sulcatus* being as destructive as usual to Primulas, &c., at Welbeck, and especially to some *P. Japonica*, from which larvæ were picked in great numbers. In the same frame were about a dozen other plants in pots, of which the balls of earth were frozen into solid masses. After being in this state for about eight weeks they were placed, about the beginning of March, in a Vinery just starting, and on the 15th two Beetles appeared, and others successively, until by the 29th a hundred and twenty-six had made their appearance, the greater part of the number coming out on the 20th, when sixty were captured. They crawled up leaving a little hole in the soil (each Beetle with a little of the earth, that had adhered to it in forcing its way, still on the wing-cases), and in some instances so recently developed as to be still soft. After crawling out of the soil they remained quiet amongst the young leaf-stalks just above the surface, and some on the inner rim of the pots, conjecturally, waiting for darkness to start on their errands of destruction. From observations made during February of the present year on larvæ of *Otiorhynchus sulcatus*, which had been left in earth in flower-pots in my garden at Isleworth exposed to cold, reading as low as $11^{\circ}8$, they appeared, with scarcely any exception, entirely uninjured by the severe weather. The balls of earth were frozen hard, and the larvæ stiff and motionless, but they gradually regained flexibility, and for the most part (and the few exceptions not evidently attributable to cold) appeared in complete health in all respects. Soot and sulphur are mentioned by Mr. W. R. Scowcroft as having been found of some service for application to garden plants at Lathom, near Ormskirk, Lancashire, but not as being satisfactory, from the frequent renewal needed with regard to the soot, and the great quantity of sulphur requisite for thorough effect.

3. Sitones lineatus. Pea Weevil. These are mentioned by Mr. Fitch as very abundant in spring on the Peas, and very destructive

to the plant. The perfect Beetles which had survived the winter were to be found till the end of May. The autumn swarms, which are usually so abundant on the Red Clover that it is impossible to avoid noticing them, were this year totally absent. At Maxwelltown, also,



SITONES (left, *S. CRINITUS*; right, *S. LINEATUS*).

Mr. Service mentions numerous complaints of this Weevil; otherwise it has been little noticed this year. At Sedbury, West Gloucestershire, where the Weevils are commonly very plentiful, they are mentioned as less numerous than in ordinary years, and also as not nearly so abundant as usual at Kingsnorth, in Kent. At Isleworth I saved the Peas in my garden from all attack by having them sown in coal ashes, which had been well saturated with the mixture known as soluble phenyle, used diluted in the proportion of about two table-spoonfuls of fluid to two gallons of water, the ashes being covered up and left some days to get thoroughly imbued with the smell. Observations are greatly needed as to where these Weevils lay their eggs, and what the larvæ feed on. The females lay freely in captivity in May, depositing the eggs (apparently at hap-hazard) on any accessible surface, whether leaves, earth, or the glass of the cage. None of these eggs, however (though presumably fertilised, and treated with care), have ever hatched in my own experience.

4. *Agriotes lineatus* (and allied spp.). Wireworm Beetle. At Dalkeith, Mr. Malcolm Dunn mentions that Wireworms have been much less seen or destructive than usual, and in turning up soil infested by them they have been observed at a greater depth than usual. Mr. Fitch observes that he never remembers these larvæ in such numbers amongst the Corn so late as in this season, but though generally common near Maldon no specially injurious attack occurred. In an eleven-acre field of Mangolds the Wireworms were found commonly at every hoeing, and in such quantities as to attract the attention of the labourers employed when the crop was pulled in the

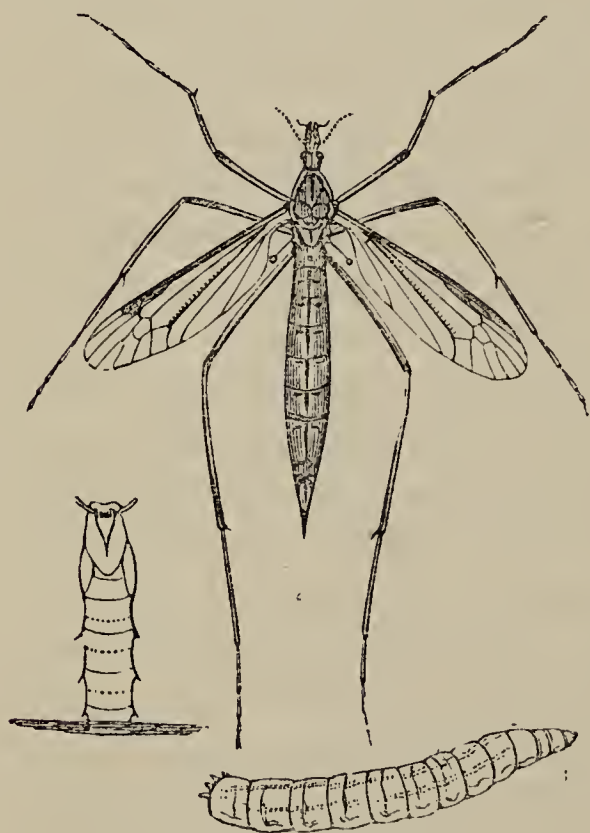
first week of November. The safety of the roots appears to have been partly attributable to the enormous quantity of "black grass," *Alopecurus agrestis*, which, being unconquerable from the wet weather, to a certain extent attracted the Wireworm from the roots. After the



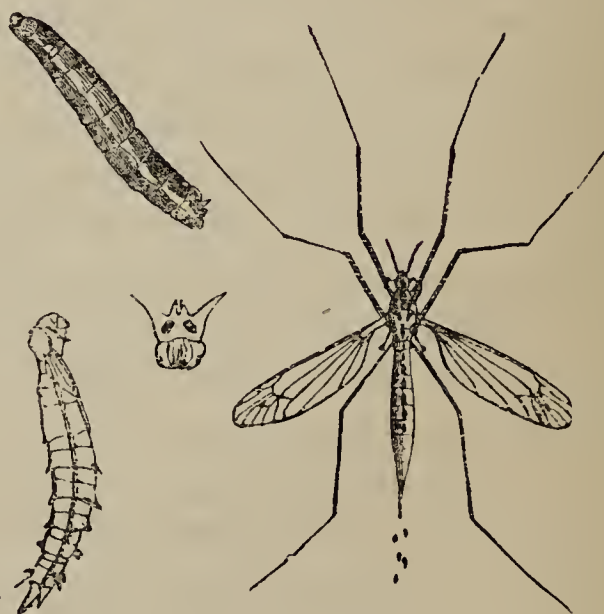
AGRIOTES LINEATUS.

Mangolds were pulled Peewits and Rooks were busy on the field for a week, probably doing good service in clearing larvæ. At Knebworth, Herts, Mr. Benjamin Brown mentions the larvæ of *Agriotes obscurus* as doing much damage on some light-land farms to the young Barley after fallow, and where the land was in bad condition; but where the Barley succeeded a good crop of roots, fed on the land by sheep, or where there was plenty of manure in the soil, the plants grew too vigorously to receive much injury. On heavy clay land the soil was so close that the Wireworm could hardly exist. Mr. Silvester, writing from the neighbourhood of St. Albans, also notices that Wireworm has not been as destructive as usual in the fields. Mr. Matheson mentions that at Addington, Bucks, Potatoes that were planted on ground trenched, and the turf buried during the severe weather of last winter, have suffered very much. He notes the Wireworm being, as a matter of course, troublesome on newly broken-up ground, and that in breaking up pasture land, breast ploughing, and burning the turf, would be a good measure for destruction of the insects. At Tangley, Guildford, Mr. Newton Smith notes that a piece of Wheat was being ravaged in May by larvæ of *Agriotes obscurus*, but being on very loamy soil and exposed to excessive rain the frequent application of Crosskill's roller saved it (? by preventing the passage of the Wireworms from plant to plant). Mr. Hart records no damage of any importance being done this year by Wireworm in the neighbourhood of Ashford, Kent. At Tranmere, near Birkenhead, the Wireworm was moderately plentiful, but not very injurious; and at Huddersfield, Yorkshire, Mr. Mosley mentions a field dressed with excessively stimulating

animal manure being badly infested with Wireworm. This agrees with the observations of Bouché, quoted in Curtis's 'Farm Insects,' p. 159, of the Wireworm sometimes living in multitudes in dung. Mr. D. Sym Scott, writing from Ballinacourte, Tipperary,—after mentioning that the most destructive ravages of the Wireworm in the locality appeared to be more than usually confined to sheltered gardens and fields,—gives some useful observations as to relative amount of Wireworm attack, under different methods of treatment, on a piece of ground which, for fourteen years prior to 1878, had been lying out in grass, and last year was in Oats. Of this he remarks, only half the field was ploughed last autumn; the other half, being required for hand-feeding sheep, was not turned over until just before seed sowing; on the latter half the Wireworm was most destructive. Over a portion of this unploughed stubble, timber was carted during the winter months from a neighbouring plantation, and on the part that was carted over there was no appearance of the Wireworm. From this Mr. Scott draws the lesson, "Plough early, and use a land presser." Rape cake has been mentioned to me as a useful preventive for Wireworm, but I have no detail of experiment.



TIPULA OLERACEA.



TIPULA MACULOSA.

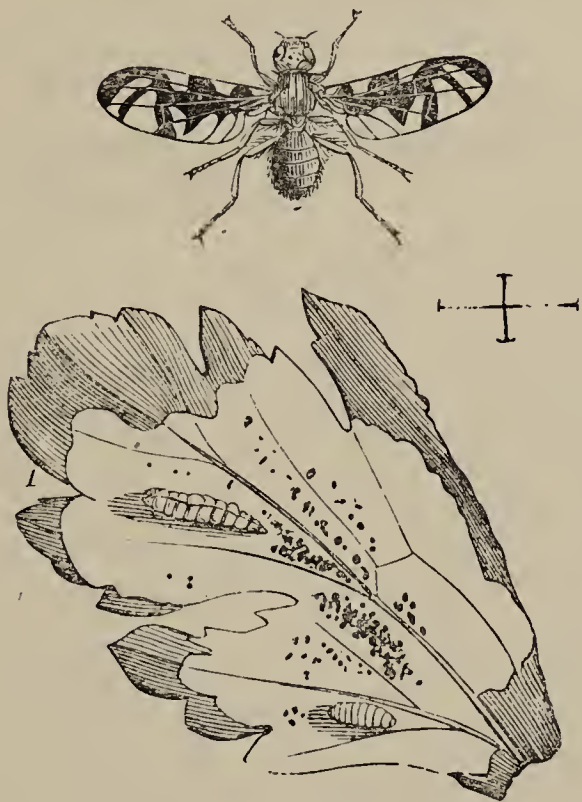
5 & 6. *Tipula oleracea* and *Tipula maculosa*. Crane Fly; Leather Jackets (larvæ). The larvæ of these Flies, often known as Wireworm in the South of Scotland, appear to have been numerous and injurious generally this year, excepting at the most northerly

point of observation. Mr. McDonald, writing from Kirkwall, Orkney, mentions the grub of the Crane Fly being little noticed during spring in the neighbourhood. He observes that when the months of May and June are cold and wet this grub is often very destructive to the field crops, but less so on light land and in warm weather, conjecturally from its more rapid development. Deep digging in winter and keeping the ground well stirred are found to be good preventives, and also the application of seaweed as a manure, before the ground is ploughed, this insect appearing to have a great dislike to anything of a salt nature. At Dalkeith the Crane Fly was comparatively scarce. Mr. Service observes that at those spots in the neighbourhood of Maxwelltown, Dumfries, where the Crane Fly was so destructive in 1878, it was scarcely noticeable this season, whilst in others in the same locality it was present to a most injurious extent. According to report grub-worms had been counted at the rate of twelve, and even up to twenty-four, per square foot; and this insect is considered by Mr. Service as without doubt the worst pest of the district. At Scotswood-on-Tyne, in Northumberland, also, these grubs were very injurious. Mr. Herbert Grace mentions that in some places the Corn was entirely destroyed by them; and in July and August the "Daddies" swarmed in the long grass. Wherever the grub occurred it was amongst Corn grown after "lea," and it was in the greatest numbers on heavy land. At Tranmere, Cheshire, Mr. Willoughby Gardner mentions that he never remembers the Crane Flies occurring in such numbers before: the perfect insects were most numerous the second week in August, when the noise they made buzzing about in swarms was distinctly audible in the fields. Mr. W. R. Scowcroft, writing from Lathom, Ormskirk, Lancashire, a district noted for its Potato crops, mentions that the *Tipulæ* larvæ attacked the Potatoes severely, eating through the stems. The larvæ were in such numbers that on one farm women and lads were employed to collect the grub, at so much a quart. The country round Ormskirk is flat, and the ground having been several times flooded this season has probably made it attractive to this damp-loving insect. The unusual quantity of *Tipulæ* round Brecon is mentioned by Mrs. Garnons Williams, of Abercamlais, as the great insect feature of the year. The larvæ of *Tipula maculosa*—small, light-coloured, and softer, as compared with the Leather Jackets, the larvæ of *Tipula oleracea*—are noted by Mr. Fitch as very destructive, in a nine-acre field of his at Maldon, to Wheat after Red Clover. In April he had the Charlock (*Sinapis arvensis*) pulled, and the soil being wet and tenacious much was adherent to the fibrous roots, and the quantities of small *Tipulæ* larvæ exposed were enormous. In this

miserable season no remedy appeared applicable, and the amount of plant was seriously diminished. With regard to *Tipula oleracea*, Mr. Fitch mentions the larvæ have been very abundant in his meadows and Lucerne leys this year; and notwithstanding the great numbers daily cleared off by the Starlings have been destructive to some extent. The perfect Crane Flies were first noticed on September 5th, and became generally common from the 10th and 12th. As this is the first time in which this insect, so disastrously destructive to grass land, is included in our Report, Mr. Fitch records an instance of a remarkably bad attack occurring in a fair sized garden, at Maldon, in the beginning of April, 1876. The lawn was completely bared, and the larvæ in such numbers that there was no difficulty in collecting them in barrowfuls; fifty-seven larvæ were counted at one Daisy root. Hand-picking was useless, and a quantity of Ducks were turned in, the soil being stirred into shallow furrows from time to time to allow them to reach their prey. Eventually the ravages ceased almost as suddenly as they had begun, but not until every piece of grass in the garden was bared, as if it had been cut with a turfing iron and left to die on the spot. Grass seeds were sown in the late spring, and their growth encouraged by a judicious use of nitrate of soda and dissolved bone manure. This soon restored the turf, and the *Tipula oleracea* has hardly been noticeable since. Looking at the partiality of *Tipula* larvæ for damp ground, and that of the perfect Crane Flies for rough neglected herbage, and their dislike to saline presence, it seems as if something might easily be done by draining, removal of lurking places, and dressing with chemical manures, at least to diminish this trouble; and the fondness of birds for the grubs shows a direct method of destruction, whether by general encouragement of Insectivora in the fields, or the more limited application available in the garden.

7. *Anthomyia ceparum*. Onion Maggot. Onion Mack (Scot-tice). Mr. McDonald mentions that at Balfour Castle, Kirkwall, Orkney, the Onion Maggot showed itself in the greatest numbers where Cow manure had lain for a considerable time previously to it being dug in; all the plants near to or beneath the position of the heaps were cleared off about July 1st. In the Isle of Mull the *Anthomyia ceparum* is mentioned by Mr. Grierson as exceedingly plentiful, fully two-thirds of the crop being destroyed. Mr. D. Melville, writing from the Gardens, Dunrobin Castle, Sutherland, notes that the Onion Fly has not been troublesome there this year. He says:—“I find the best preventive in our light soil is to manure well with

well-made manure, principally Cow manure. We work the ground deeply, and trench if need be. After lying exposed to the frost for some time, the ground is pulverised (with a steel fork), on the surface, without turning up the manure, then trodden down well previous to sowing, which we do as early as possible in March, providing the ground is in good condition. We sow in lines a foot apart. After covering in the seed we pass a heavy iron roller a few times over the ground to firm it well. We sow thinly, so that we seldom require to thin the plants. In this way we never fail to have excellent crops of Onions, although the garden has been very subject to attacks from Onion Fly; and there are many gardens in the neighbourhood where the Fly has all its own way with the Onion crops." At Maxwelltown Dumfries, Mr. R. Service mentions the Onion Fly being as destructive as usual; and observes that it is worse on the little plots of the cottagers than in large gardens or nurseries, this (conjecturally) owing to the difference of cultivation. Possibly, also, though this may be included under the head of cultivation, the amount or nature of manure applied in cottage gardening may be insufficient or unsuitable. At Bury, Lancashire; Addington, Bucks; Isleworth, and Maldon, the Onion Fly was not noticed. At Tangley, Guildford, the Onions were remarkably good on the same plot of ground used last year; a liberal supply of wood ashes and ashes of garden refuse was given as manure.



TEPHRITIS ONOPORDINIS.

8. Tephritis Onopordinis. Celery Fly. This is mentioned as very prevalent at Addington, Bucks; Ashford, Kent; and Maldon;

but not as causing much damage. Mr. Dobson mentions the grubs of the Celery fly as doing much damage at New Malden, Surrey, about September 28th. On October 15th he notices them as still extremely numerous, and much more so than last year, for then some plots escaped; this season the celery in the same ground has been wholly destroyed. At Sedbury, West Gloucestershire, it is mentioned as in greater quantity than it had ever been seen before; and in various localities at Isleworth the crop was much injured; but on November 7th I noticed a patch of Celery that was remarkably healthy and little injured by the Fly in a garden on Hounslow Heath, not in the immediate vicinity of other Celery plants; this was on peat soil, shown in section to be about a foot and a half thick, over-lying three feet of gravel; possibly the gravel went much deeper, but the section was only about five feet deep. The commonly suggested remedy of pinching the grub in the blistered leaf, or removing the infested piece, does not seem to answer excepting when the attack is slight; and as the maggot is sheltered inside the leaf the only preventive appears to be making the leaves distasteful for oviposition to the Flies, or poisonous to the newly-hatched maggots. Mr. Herbert Grace mentions that he has found a solution of washing-soda, liberally applied to the plants, very effectual in destroying these pests.



PSILA ROSÆ.

9. Psila Rosæ. Carrot Fly. The Worm (Scottice). With regard to this Fly Mr. Donald mentions that at Balfour Castle, Kirkwall, the ground is of a strong clayey nature, and many experiments have been tried in previous years to grow good Carrots, but without effect. Last winter, however, instead of digging in manure about the same quantity of peat and sand was dug in, and before sowing a good watering with gas-water was given, and the result of the treatment has been a beautiful crop of clean Carrots. At the Gardens, Dunrobin Castle, Sutherland, Mr. Melville mentions the Carrot Fly as being always troublesome. In most years a good yield is secured by carefully trenching, and keeping the manure about a foot or fifteen inches from the surface. This year, however, the Carrots were grown principally

on a piece of ground which, though thus treated, was where Strawberries had been grown the previous year, and on this piece the attack of the Fly was worse than it had been known for several seasons. A few rows at one side were sown on a piece of ground which did not require trenching, this having been done the previous year; these were comparatively free from the attack of Fly or Grub. A few rows in another part of the garden, which had been trenched and prepared for Strawberry planting, were comparatively free from Grub. Mr. Melville considers that in gardens where Carrot Fly abounds Carrots should not be sown where Strawberry plantations have been recently dug, or trenched down; and that if Carrots require thinning this should be done when they are an inch or two high, as if thinned when from this size to six or eight inches high the Fly seems to attack them more readily; he mentions wet weather as the best time for thinning, and that his practice is to use the best seed, sow thinly, and never thin at all till the Carrots are beyond the reach of the Fly, and fit for kitchen use. Mr. Webster, writing from the Gardens, Gordon Castle, Fochabers, Banffshire, mentions that this year the Carrot crop proved an entire failure; and his report is of considerable interest, as in 1878 there was not a single root infested in the Carrot crop grown on the same piece of ground, and treated in precisely the same manner. Some of the ground was trenched, other portions sown without trenching, and all otherwise treated alike, viz., by covering over the seed in the drills with fully half an inch thick of sifted wood ashes. This season not one of the different plots escaped. The Carrots were all attacked about $2\frac{1}{2}$ to $3\frac{1}{2}$ inches below the surface, showing that the larvæ did not like the caustic contained in the ashes, the upper part of the Carrots remaining perfectly sound. In this case it appears to me open to suggestion that the attack might be from larvæ remaining in the ground, and that the preservation of the root for as deep down as the effect of the wood ashes reached points to the possibility of doing good by waterings of an alkaline nature, such as might be distasteful to the Grub, and contain constituents of the root. Analysis shows thirty-two parts in the hundred of potash and fourteen of soda in the constituents of the Carrot root, and the application of chemical manure, that would both press forward the Carrot growth and be deterrent to the Grub, in a form that would take itself well to the bottom of the root, might have an excellent effect. At Torloisk, in the Isle of Mull, Mr. Grierson mentions the Fly as being very destructive this season. The Carrot Fly appeared as usual in July at Dalkeith, and its ravages were about the usual amount. Mr. Service notes the garden crops of Carrots at

Maxwelltown as more severely attacked by the *Psila Rosæ* than he remembers in previous years, to such a degree that he hardly knew of a single professional gardener who saved a crop; but at the same time he notes it as a curious circumstance that the field crops were scarcely touched; it is considered locally that in wet seasons the Carrots escape the Fly.

10. Aphis Rumicis. Bean Aphis; Collier. Black Fly (Scottice).
No notes.



PIERIS BRASSICÆ.

11. Pieris Brassicæ. Large Cabbage Butterfly. The amount of appearance of the Pieridæ has varied much in different localities. Mr. Malcolm Dunn mentions that at Dalkeith the Large Garden White Butterfly (*Pieris Brassicæ*) appeared in rather formidable numbers after the fine weather set in. The consequence was a severe attack of its caterpillar, especially in cottage gardens surrounded by weedy hedges, and other harbours for insects, where the common Cabbage, Savoy, &c., were completely riddled by the vermin, and rendered totally unfit for human food. Mr. Dunn considers the best remedy is hand-picking the caterpillars, but this is tedious; and he mentions that a sprinkling of fine salt is very serviceable, carefully applied by turning up every leaf, so that a small portion of the salt shall touch every grub. The application of finely-powdered lime in a caustic state, or even caustic soot, will get rid of the grubs, but both are objectionable with regard to the after use of the vegetables. At Marchmont Dunse Mr. P. Loney notices the almost total absence both of the butterflies and the larvæ. At Scotswood-on-Tyne, Mr. Grace mentions *Pieris Brassicæ* and *P. rapæ* being so scarce he could almost count the specimens, and that with repeated search he did not find one caterpillar. At Huddersfield, Knebworth, Chichester, and Maldon, few were observable; and Mr. Norgate mentions *P. Brassicæ* not being

as plentiful as usual near Norwich. At Isleworth *P. rapæ* were moderately plentiful. Mr. Rolfe notices *P. Brassicæ* as very scarce at Kew in the spring; and the autumnal brood also as few in number, but more numerous. The first appearance is noted on June 8th. *P. rapæ* appeared on May 4th; *P. napi* was not observed. Mr. Rolfe mentions having found pupæ of the Pieridæ attached to walls, and frozen so hard that they could be snapped like sticks, but of which those kept for observation appeared perfectly healthy on being thawed, and produced perfect imagos in due time. On the other hand, great numbers of the Large Cabbage Butterfly were observed in the Isle of Mull by Mr. Grierson, but few caterpillars. At Aber Camlais, Brecon, they appeared early in the year, and the butterflies were plentiful, but little injury done by caterpillars. At Sedbury Park, West Gloucestershire, the caterpillars were very numerous; and they are also mentioned by Mr. Hart as doing great harm to the Cabbage in gardens at Kingsnorth, Ashford, Kent, so that on examining a small plot of Cabbages in his own garden scarcely a plant in it was without some amount of eggs. Such pupæ of the Pieridæ as I had opportunity of examining during the continuance of the severe cold of the winter of 1878-79, when the minimum reading of the thermometer ranged between 10° and 30° on twenty-five nights in January, appeared perfectly uninjured by it: *P. napi* was only temporarily stiffened, and *P. rapæ* developed the imago on April 4th from specimens brought in after February 7th, this appearance being exactly a month before the first specimen noticed of *P. rapæ* out of doors. The parasites in a pupa of *P. napi* were also temporarily stiffened, but otherwise uninjured.



MAMESTRA BRASSICÆ.

12. Mamestra Brassicæ. Cabbage Moth. This moth is mentioned by Mr. F. Norgate as abundant at Sparham, near Norwich, on July 12th; and the caterpillars are noticed by Mr. Dobson as being unusually plentiful at New Malden, Surrey, at the beginning of October; otherwise it appears not to have been as numerous as usual. At Bury, Lancashire, it is noted by Mr. Kaye as less plentiful than

usual; and also at Tangley, Guildford. Mr. R. A. Rolfe mentions that the caterpillars of this moth did some amount of damage to the autumn Cabbages near Kew; in some plots the hearts were much riddled, and hand-picking resorted to with partial success.

13. *Agrotis segetum*. Turnip Moth. We have no notes of appearance of *Agrotis segetum* taken by itself, but the surface caterpillars appear to have been excessively numerous at different localities. Mr. Tait, of Inverurie, Aberdeenshire, mentions Noctuæ as being more than usually plentiful up to the end of July; after that they were scarce, and several of the autumn species did not occur at all. Mr. Tait mentions that snow lay on the ground in the district from early in December until April; and he attributes the preservation of the early summer Lepidoptera to this protection, and the small quantity of autumn appearance to destruction in their early stages by cold wet weather after thawing of the snow. He notes the autumn larvæ as very abundant. Mr. Kaye mentions that at Bury, Lancashire, the surface caterpillars have been very numerous and destructive; and at Tranmere, Cheshire, Mr. Willoughby Gardner observes that the larvæ of various common Noctuæ, as *Agrotis*, *Mamestra*, and others, have been a regular pest in gardens this summer, eating up all the green leaves, and even turning as a last resource to Ivy and Ferns. Mr. Fitch also mentions a similar visitation in a garden at Islington, where the numbers of larvæ were enormous. These larvæ appear to bear low temperatures perfectly well, for a few specimens of surface caterpillar, which I found in my garden at Isleworth, were quite uninjured by frost penetrating for many days (at readings of between 32° and 33°) a foot deep into the ground; and many specimens were brought me in from the neighbourhood also perfectly uninjured.

14. *Phyllotreta undulata*, and other species. Turnip Fly. Flea Beetle. Mr. McDonald mentions the Fly as being usually rather destructive at Kirkwall amongst the Turnips in a mild summer; if the season be wet and cold it is hardly noticeable. Dusting the leaves with wood ashes whilst the dew is still on is found to be a good remedy. At Dunrobin, Sutherland, Mr. Melville notices that the Turnip Fly has not done much mischief, probably owing to the wet weather. Many fields of Turnips were almost a total failure, but the season appears to have been too wet for the Fly to have much to do with it. In Isle of Mull the Fly is mentioned by Mr. Grierson as not being as numerous as in previous years; and at Inverurie, Aberdeen,

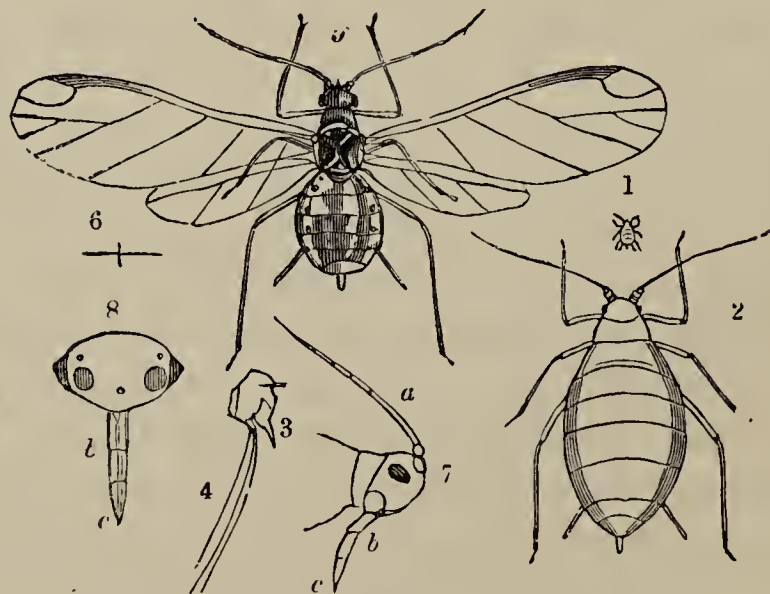
Mr. Tait mentions it also as not being especially abundant; and as the Turnips were sown late and grew rapidly little damage was done. Mr. P. Loney, writing from Marchmont, Dunse, Berwickshire, notices the Turnip Flea as extremely numerous. Owing to the cold state of the soil the plants in many cases never got beyond the Cotyledons, when they were eaten over. The rainfall of June amounted to 5.30 ins., but had no effect on the Fly. The rainfall of July gave a total of 6.40 ins., leaving the land in such a state it was impossible to work the soil, consequently many acres could not be sown. Mr. Robert Service mentions the Turnip Fly as extremely prevalent near Kirkcudbright, where it entailed the loss of a large quantity of seed. In Wigtonshire it committed unusual ravages, and a great breadth of the crop required to be resown. At Maxwelltown, Dumfries, it was noticed on June 14th at one or two farms only, but not to any great extent. At Dalkeith Mr. Malcolm Dunn mentions there was a slight appearance of Turnip Fly accompanying three or four days' fine weather about June 20th, but this was not nearly to the same extent that is usual in the district, in seasons more favourable to the beetle, so that the damage done was comparatively trifling. At Scotswood-on-Tyne Mr. Herbert Grace mentions the Fly as not doing much harm, excepting on badly-farmed lands, where the Turnips had to be resown on account of its ravages; and he draws attention to previous observations in the Reports of the spread of the Fly from Charlock. At Knebworth, Hants, and Addington, Bucks, the Fly was scarce, or not troublesome, apparently from the wet and cold weather; and at Sedbury Park, West Gloucestershire, it was not as numerous as in some previous years. In the neighbourhood of Exeter it is mentioned by Mr. D'Urban as being very numerous in gardens in July, and that as far as his observations went the commonest species was *Phyllotreta nemorum*. At Tangley, near Guildford, Mr. Newton Smith notes (as showing that rain alone cannot always be depended on to clear the Fly) that Turnips which germinated about the middle of May were badly attacked before the application of soot. He also draws attention to the importance of such liberal feeding to the plant as may induce a vigorous growth after setting out that will baffle the Fly. This point, also, Mr. Silvester previously drew attention to and illustrated from the various amount of injury to his crops by Fly, according to their luxuriance and healthiness of growth. This year Mr. Silvester mentions his root crops as exceptionally free from Fly, though suffering from the bad weather. From Maldon Mr. Fitch returns, "no Turnips, therefore no Fly"; and from Kingsnorth, Kent, Mr. Hart similarly reports, "Scarce, the Turnip crop generally being a failure

with us this year." At Kew the Fly is mentioned by Mr. Rolfe as entirely absent or unnoticed; and I only observed it in small numbers in the adjacent district of Isleworth. I am informed by Mr. J. Chambers, Hounslow, that the application of hops fresh from the breweries is found very useful round Hounslow in keeping down Fly on the Cabbage crops. The reader will notice that Fly has been little noticed in the returns, excepting in the four southern counties of Scotland, and in some degree in the adjacent county of Northumberland.



ATHALIA SPINARUM.

15. *Athalia spinarum*. Turnip Sawfly. Nigger. Entirely unnoticed in Turnip crops.



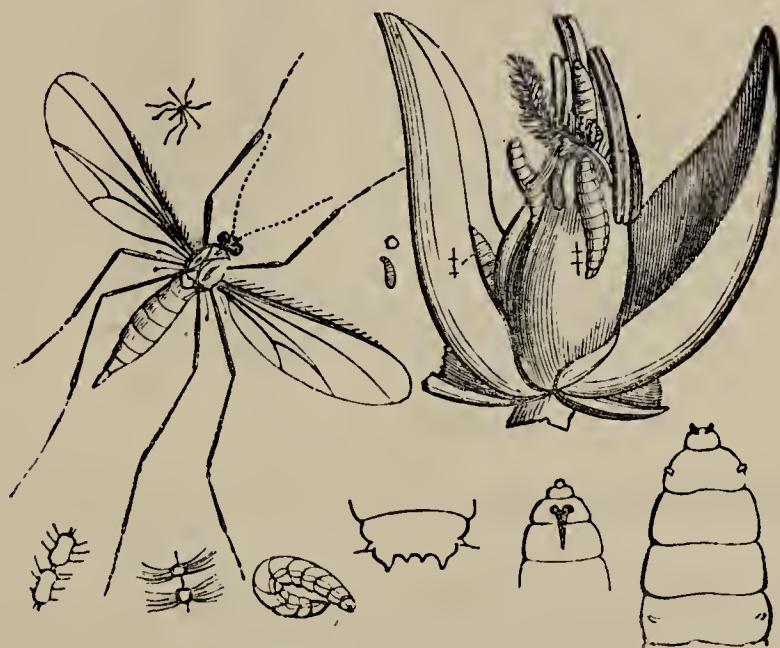
APHIS RAPÆ.

16. *Aphis Rapæ*. Turnip Aphis. Blue Fly (Scottice). No notes,



CEPHUS PYGMÆUS.

17. *Cephus pygmæus*. Corn Sawfly. No notes.



CECIDOMYIA TRITICI.

18. *Cecidomyia tritici*. Wheat Midge. Red Maggot. Mr. Brown, of Knebworth, mentions that the Red Maggot was abundant in all the earlier Wheat fields, and did much damage, but little to the later crop; Wheat-ears did not make their appearance until about June 29th, instead of June 12th, which may account for the date of the attack. The Rev. Arthur S. Ormerod, writing from Halvergate Vicarage, in the East of Norfolk, similarly observes that in a little patch of Wheat, a quarter of an acre, sown in the autumn, suffered

much from the Wheat Midge; whilst another quarter of an acre close alongside, which, owing to wet and frost, was not sown till spring, was not injured by it. Mr. Fitch notices that on June 27th, at Maldon, the Wheat Midge was especially abundant, whilst there were as yet no Wheat-ears in which it could lay its eggs; no damage took place from the ravages of the larvæ. Mr. Edward Parfitt mentions the *Cecidomyia tritici* as little observable this season near Exeter; and the Wheats round Kingsnorth, Kent, are mentioned also as very free this year from the Red Maggot. At Ballinacourte, Tipperary, it is mentioned as plentiful by Mr. Sym Scott.



CHLOROPS TÆNIOPUS.

19. Chlorops tæniopus. Corn Fly. No notes.

20. Aphis granaria. Wheat Aphis. Mr. Leather, writing from Delamere Lodge, near Northwich, Cheshire, gives a detailed account of an extremely bad attack of this Aphis on 110 acres of Wheat. He mentions the Aphides as first appearing in the early part of August, and shortly after they were not as observable; but about September 8th they were again noticeable in as great, or greater, numbers than before. The ears they had previously attacked had become perfectly white, as if blasted; and at the date of the communication (September 16th) every green head in the field appeared full of them. It was estimated that what ought to have given four to five good quarters of Wheat would not yield more than ten to twelve bushels per acre, and

that of very inferior quality. The Wheat was March-sown, part after Turnips, part on a Clover stubble. The land is naturally poor and light, but has been marled and heavily caked. The application to each acre would average 6 cwt. of cake, two-thirds linseed and one-third decorticated cotton-cake, consumed by sheep on the ground. The weather during the season is noted as having been the wettest on record, and the crop as six weeks later than in average seasons. Mr. Mosley also mentions that the Wheat Aphis literally swarmed at Thornhill, near Dewsbury, Yorkshire, both on Wheat and Barley, doing much injury.

21. Cossus Ligniperda. Goat Moth. Ogger, or Auger, Worm (Scottice). No notes of remedies beyond the well-known method of extracting the larvæ with a wire.



ZEUZERA ÆSCULI.

22. Zeugera Æsculi. Leopard Moth. More common than usual at Maldon. During the severe weather of the winter a few specimens of larvæ were brought to me in small boughs, or rather in thick twigs, at Isleworth, quite uninjured by cold.

23. Bombyx Neustria. Lackey Moth. No observations, excepting of its complete absence at Maldon, where in the previous year it had appeared in such enormous quantities that Mr. Fitch had his Apple trees hand-picked, and the larvæ collected in pails and scalded.

24. Yponomeuta Padellus. Small Ermine Moth. The larvæ injurious on Apple trees, at Chichester, about July 4th.



BOMBYX NEUSTRIA.



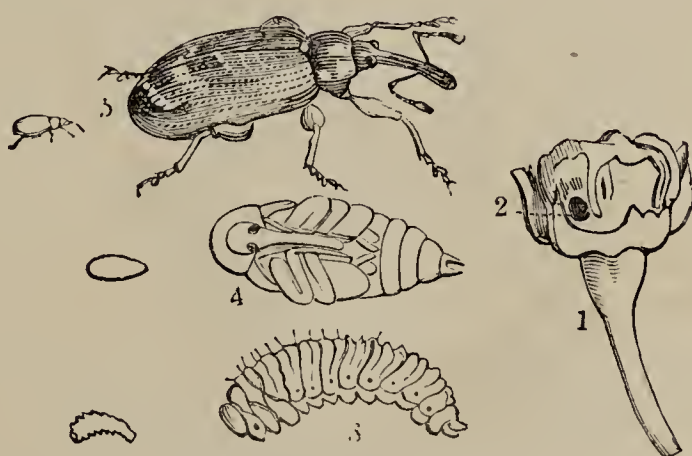
YPONOMEUTA PADELLUS.



ABRAXAS GROSSULARIATA.

25. *Abraxas Grossulariata*. Magpie Moth. This appears to have been unusually plentiful, as well as the Gooseberry Sawfly. Mr. McDonald mentions the caterpillars attacking the Red and

White Currants, in Orkney; and at Dunrobin Castle the Gooseberry caterpillar is also mentioned as troublesome. At Scotswood-on-Tyne, in Northumberland, Mr. Grace mentions that by far the most noticeable insect occurrence of the season was the large amount of *Abraxas Grossulariata*, though the damage done by the larvæ was small. During this season he observes the moths have been so plentiful that fifty specimens might be captured in half an hour; and this abundance is the more remarkable as for eight previous years not a single specimen had been taken by Mr. Grace whilst collecting Lepidoptera. At Tranmere, Cheshire, it is mentioned as rather more scarce than usual; and near Ashford, Kent, it was noticed on the Blackthorn, but not in great numbers anywhere. Mr. Norgate, writing from Sparham, Norwich, mentions the larvæ as more plentiful than usual on the Blackthorn; and they are also mentioned by Mr. Fitch as in extraordinary abundance on Blackthorn hedges near Maldon. At Addington, Bucks, Mr. Matheson reports it as doing an immense amount of damage where not checked, and recommends careful attention to the bushes, and drawing the sprays through the hand as soon as ever the caterpillars appear, so as to remove them before they have time to spread over the tree. At Sedbury, West Gloucestershire, this insect is also mentioned as hurtful; and at Exeter Mr. D'Urban observes the larvæ were first noticed on May 18th, feeding on Red Currants trained on a wall, and a few on Black Currant bushes; at the end of June they were numerous on Blackthorn in hedges; and at the end of August the moths appeared in unusually great numbers on the hedges near Dawlish, and generally in the neighbourhood.



ANTHONOMUS POMORUM.

26. *Anthonomus Pomorum*. Apple Weevil. Of this we have only a note from Mr. Hart, mentioning it being less abundant than usual at Kingsnorth, near Ashford, Kent.

27. *Eriocampa adumbrata*. Pear Tree Slug Worm. Mr. Malcolm Dunn mentions that the Pear Tree Slug, which last year did much damage in the district round Dalkeith, has been scarcely noticed this season, and that the easily applied remedies of a dusting of



ERIOCAMPA ADUMBRATA.

caustic lime, or a heavy syringing of the trees with strong soapsuds, are generally very effective in getting rid of this pest. Mr. R. Service notes that the insect sometimes appears in destructive abundance near Maxwelltown, making an unsightly mess of Pear, Cherry, and Plum trees, in the nurseries, but that it appears of very uncertain occurrence, in some years being totally absent. A very few of the larvæ were observed on Espalier Pears at Maldon this year, but not until the autumn. Mr. Fitch mentions that in previous years they have usually been exceedingly abundant in his garden, the foliage of the Pear and Cherry trees often assuming quite a scorched appearance from the ravages of the larvæ.



NEMATUS RIBESII.

28. *Nematus Ribesii*. Gooseberry Sawfly. This appears to have been unusually prevalent and injurious at all the points from

which we have notes, excepting at Inverurie, near Aberdeen, where Mr. Tait mentions that on the whole there was less injury than usual. With regard to remedies for this insect I am favoured with a note from Mr. McCorquodale, of Scone, which I have great pleasure in inserting, as the application of hellebore powder appears to me very perilous, excepting where it can be kept thoroughly under the eye of the superintendent. Mr. McCorquodale says:—"Twenty years ago I dusted my bushes with white powdered hellebore, and ten days after (being dry weather from the time they were dusted) a tart was prepared of berries from these bushes. After partaking of the tart we all got seriously ill, but recovered, and next day we were all right. Since that period I never again made use of hellebore for destroying caterpillars on Berry bushes. The remedy I have used ever since instead of hellebore, with equal success, is flower of sulphur. It is easily applied by dusting it over the bushes with a pepper-box while they are under the morning dew; or, if during dry weather, the bushes ought to be watered and then dusted. It is only necessary to dust the lower part of the bushes if taken in time. The use of sulphur is perfectly safe, and berries may be used at any time after its application." Mr. R. Service mentions it as very destructive at Maxwelltown, from June 5th onwards. At Ormskirk, Lancashire, Mr. R. Scowercroft mentions it had been much observed through the neighbourhood for its destructiveness, the larvæ taking to the Currant bushes after finishing the Gooseberries, of which they even attacked the fruit. At Huddersfield, Yorkshire, and Tranmere, Cheshire, it is also mentioned by Mr. Mosley and Mr. Gardner as very injurious, the bushes in both localities being in some cases stripped of their leaves. Mr. Bairstow, of Huddersfield, adds, "The Gooseberries have been devastated by the larvæ this year." Mr. J. B. Bridgman, of Norwich, says, "*N. Ribesii* is doing great mischief in the gardens, stripping Gooseberry and Currant bushes of every leaf, leaving only the stalks and larger veins remaining;" and, writing from Maldon, Mr. Fitch mentions the great abundance of this Sawfly everywhere. Hand-picking did not save the leaves of his Gooseberry bushes from being speedily reduced to skeletons, the quantity of food consumed in the time being almost incredible. Mr. Anderson mentions that near Chichester the first brood of *Nematus Ribesii* made their appearance from June 3rd to 17th on the Gooseberry and Currant trees. He notes that the eggs are laid in the nervures of the leaves, and the presence of the larvæ first shown by numbers of minute holes in the leaves, looking as if they had been riddled with shot; also that the habit of the larvæ appears to be to attack the lowest branches first, and work upward till they

have stripped the whole tree. A second brood of the Gooseberry caterpillar, still more numerous and injurious than the first, is mentioned as appearing on July 20th. The larvæ of the Gooseberry Sawfly are also mentioned as extremely abundant, and doing much damage to the foliage of the bushes at New Malden, Surrey. At Ashford, Kent, a few were observable in almost every garden, but little damage was done. Mr. Edward Parfitt mentions some gardens near Exeter as being much injured by this Sawfly. Mr. D'Urban notes the first observation of the larvæ on May 18th, then just hatching from the eggs on the leaves of a Red Currant against a wall; these leaves were picked off as fast as the young broods appeared, but a few grubs left were fully grown in about three weeks. They were not much noticed again till September, when the larvæ were so numerous as to strip every bush of Red Currant, and some of the Gooseberry bushes in the gardens in the neighbourhood, continuing to feed until after the frosts in the middle of October. Mr. D. Sym Scott, writing from Ballinacourte, Tipperary, mentions that only on one former occasion has he observed caterpillars of Gooseberry Sawflies as destructive to the Gooseberry and Currant bushes. These he first noticed on May 17th; and though the operation of hand-picking was commenced on the following morning they increased in numbers with extraordinary rapidity, extending in a remarkably short time over the whole garden. The weather was generally moist, and on some days it rained heavily. This insect is very troublesome, as if its ravages are not checked the productiveness of the bushes is injured for more than the season of attack. The habit of the Sawfly larva is to go down into the ground when full fed and there spin a cocoon, in which it undergoes its changes, coming up in summer as the perfect Sawfly in about three weeks; but in the case of the autumnal larvæ, remaining unchanged and curled up in the cocoons till spring, when they develop and come up from the ground when the Gooseberries and Currants are coming into leaf. For this stage skimming off the surface of the ground and burning it, with the contained cocoons, or the less complete remedy of digging, liming, sooting, or any other treatment of the ground under the bushes that would remove or kill the larvæ, would be of great use; but also for this and similar cases (though this is only a suggestion on my part) I think that Mr. Thomas's (of Ridgeovean) treatment for *Otiorhynchus* of placing tarred boards under the bushes, and causing the pests to fall on the wet tar (be they beetles or caterpillars), might be well applied. If the larvæ did not fall to a shake they almost certainly would to a good syringing with water as hot as the trees would bear, and the trouble and expense of the

application would be much less than that of hand-picking. In the case of the grub of the Asparagus Beetle, which holds very firmly, I have found almost all dropped to a shake after syringing with hot water, and I killed them on the ground with soot; and I believe (with whatever modification might be needed as to detail) that this remedy would be found of use with regard to many of the bush-feeding larvæ.



SIREX GIGAS.

29. Sirex Gigas. Giant Sirex. Mr. Matheson mentions this as having been rather common this year at Addington, Bucks, and that he has destroyed specimens in localities some miles apart. A few specimens were also noticed by Mr. John Upton, at Sedbury Park, about September 6th. Where felled Fir timber is found to contain this insect it would be well worth while either to utilise the logs at once in such part as is sound, or else to burn them, otherwise the insect will probably develop from them for successive years, to the injury of the neighbouring live timber.

30. Retinia, sp. Turionana, Buoliana, &c. Pine-bud Tortrices. Mr. Matheson mentions that the larvæ of one of the Pine-bud Tortrices has not been as injurious at Addington, Bucks, during this season as was the case two or three years ago, apparently in consequence of careful treatment. This moth attacks the Scotch, Austrian, insignis, and other species of Pine, the caterpillars injuring the leading shoots

as well of the branches as of the main leader of the tree, and causing a stunted and deformed growth. He also mentions the best remedy he is acquainted with to be hand-picking, so long as the shoots are within reach. In many cases the damage to the special tree observed is done before the presence of the insect is detected, but even then if destroyed the number is lessened for the succeeding season. June and July are the best months for examining the trees, and one man can look over a large number; and to a continuance of this treatment for some years with many thousand trees Mr. Matheson attributes his present comparative freedom from the Tortrix. Mr. Herbert Morrell contributes a description of the attack of one of the Pine Tortrices on his Austrian Pines at Headington Hill Hall, near Oxford. He mentions that these Pines, when from two to six feet



RETINIA TURIONANA.

high, are almost all attacked by some insect of which the preliminary workings are not noticeable until (as about the end of February, at which his communication took place) a gummy exudation is noticeable at the base of the leading bud. In 1878 the injured buds, which showed a minute hole at the lower part, remained green till about the end of March. About May these buds were brown, and broke off easily to a touch, showing the grub within, occupying the whole of the bud and part of the stem beneath. Absence from home prevented the completion of the observation by capture of the imago, but it is obviously one of the Pine Tortrices; and it is mentioned by Mr. Morrell as spoiling hundreds of Pines in his new Plantations, invariably selecting the leading shoots; fortunately, however, leaving the *P. excelsa* and Spruce Fir untouched.

31. *Hylobius Abietis*. Fir Weevil. Of this Mr. McCorquodale, writing from Scone, Perth, speaks as a most destructive Beetle. In 1842 he mentions first discovering the ravages of this Beetle in a young Fir plantation that had been planted the previous year immediately after an old crop of Scots Pine was removed from the ground. After a crop of Scots Pine is cut and removed from the disforested wood-land the Beetle propagates in the scaly bark that falls from the trees during the felling of the timber, independently of the stools. They continue their work of devastation among newly-planted Scots Pine for five or six years after the timber is cut away. This insect is peculiar to Scots Pine. It does not frequent disforested wood-land after any other kind of tree, although it eats the bark of *Coniferæ* generally, and its destructive operations are incredible. In



HYLOBIUS ABIETIS.

the case of a hundred acres being cleared out of old Scots Pine, and planted within four years thickly with *Coniferæ*, there would be few remaining uninjured in two years after. After many experiments Mr. McCorquodale was successful in finding a method of preparation of the ground, and treatment, which he adopts and finds to save the plants from the ravages of the Beetle. After the Pine crop is cut and cleared the ground is enclosed thoroughly, so as to exclude stock of all kinds, and if required is drained. The ground is permitted to rest the first summer for the purpose of getting up all herbage as strongly as possible, and in dry spring weather the whole is burned, so as to destroy the eggs and food of the Beetle, and, as far as may be, stamp it out. After this the ground should be planted with strong two-years' transplanted plants. After each young tree is planted a layer of earth is laid round it about two inches in thickness and eighteen inches in diameter; this layer should be beat smooth with the back of the spade

to prevent the Beetle lodging under any part of the rough surface. This treatment was found to answer very well, for as soon as the Beetle in search of food comes in contact with the bare earth it immediately steers its course in another direction and leaves the plant untouched. The Beetle is found to be most destructive in dry warm seasons. On August 30th I received some living specimens of *Hylobius Abietis* from Mr. W. Robertson, together with some young plants of Austrian and Scotch Pine, damaged by the Weevil, from Lady Reay's plantation at Blinkbonny, near Earlston. Mr. Robertson mentions that where replanting has been done in the Fir plantations, especially after a full crop of Scotch Pine, the Weevil has done a great amount of damage, in some instances completely destroying the newly-planted young trees. The Weevil is stated to die out naturally from three to six years after the crop of Firs has been cleared, and the insect appears to be less plentiful if the plantation is grazed by cattle. Looking at the habits of this Weevil in frequenting the rotting stumps in Fir plantations for breeding purposes, I suggested (as grubbing-up the stumps is too expensive an operation to be suitable on a large extent of ground) that the effect of tarring these stumps should be tried, as it could not fail to deter the Weevil from oviposition, at least for a long period. This experiment was about to be tried, but the result necessarily must be waited for. Mr. Robertson mentions that he has for some months been trying the effects of painting over the stem of the young trees with a mixture of paraffin oil and red lead, and it appears to have been fairly successful so far; but he does not consider that he has tried it long enough to speak definitely as to its power of checking the Weevil, or the effect on the trees experimented on. The *Hylobius Abietis* is also mentioned by Mr. McGregor, of Ladywell, Dunkeld, as doing damage in young Scots Fir plantations, planted after a crop of old Fir trees had been cut down; in this case hand-picking of the Weevils was adopted, and destroying them in boiling water.

32. Hylurgus Piniperda. Pine Beetle. This little Beetle is mentioned by Mr. McCorquodale, of Scone, as destructive to Pine plantations, at all stages from those newly planted up to fifty years of age. They attack the annual growths on the extremities of the branches by boring from the side of the tender shoot into the pith, and then follow the pith for an inch or two towards the point of the shoot. This is done in summer; and the following spring, during high winds, these shoots are blown off. The injury to side shoots is bad enough, but the effect of the leading shoot being blown off is for

the trees to be often bushy headed, and when the tree is thus affected it retards it in growth and reduces its ultimate value. When young Fir plantations are thinned all the brush ought to be at once removed or burnt on the ground, as this Beetle propagates in the decaying



HYLURGUS PINIPERDA.

branches in legions. They ascend the standing trees, and commit extensive ravages. When Fir thinnings are carted from the plantation it is a very common practice to dress the bark off to lighten the carriage in transit to market. The dressing off of the bark should not be permitted within the plantation; in a year after, the ground round these heaps of bark may be seen covered with grown shoots blown from the growing trees, bored by the Beetles which the heaps have nurtured.

With the above observations many other notes have been contributed, of which some are of considerable interest generally, but not being with regard to injurious insects are not available here. I have also been favoured with a few notes giving a general sketch of amount of insect presence in the Isle of Jersey, and round Denbigh, North Wales; and a few observations of injurious insects not noted in the list, which I now give, as well as some words regarding *Colias Edusa*, which, though not injurious, was included in our first Report, as possibly throwing some light on similar occasional appearances of other species. Through the hands of Mrs. Tourel, Les Pres, Jersey, I have a note of the spring and summer having been there (as elsewhere) unusually wet and cold, and insect presence less than usual.

Cockchafers have been little seen; and Black Aphis on the Beans, Green Aphis on the Roses, and American blight, have been less prevalent than usual.

Fruit crops, especially Pears and Apples, have been much injured by caterpillars, and the latter fruit much injured by grubs eating them to the core.

Late-sown Turnips were in some instances entirely destroyed by the "Black Fly," and the "White Thrips" (? *Aleurodes brassicae*) has done much harm generally in the Cabbage crops. It is mentioned that the climate of the island is so favourable to insect-life that it is much wished the subject should be followed up.

Mr. Marsden, writing from Gwynnynog, Denbigh, North Wales, reports that Wireworms, and insects generally, have been as active and destructive as ever, notwithstanding the long-continued frost of last winter, and have also been unusually prolific during the excessive humidity of 1879; and that in many instances beds of Celery and other vegetables have been entirely destroyed by insect attack. From Mr. Marsden's account salt appears to be in frequent use in the neighbourhood, both as a deterrent to the Wireworm in the fields, and also in some gardens, where it is applied thickly around the vegetables to check the insect enemies. The effects of general blight and the ravages of insects have been specially marked on this year's produce; and Mr. Marsden mentions that farmers are naturally most anxious to ascertain what effectual means can be employed to check or exterminate the pests which do such injury to their crops, and would readily experiment with any remedy that might reasonably be supposed to be of service.

Ceutorhynchus sulcicollis. Cabbage and Turnip Gall Weevil. Mr. Webster notices that agriculturists have had much annoyance in the district round Fochabers, Banffshire, from the prevalence of the Turnip Gall Maggot; and Mr. Malcolm Dunn, writing from Dalkeith, Edinburgh, mentions that Cabbage, Savoys, and Cauliflowers have all suffered more from the attacks of *C. sulcicollis* than they have done for some years, although these attacks are partial, and confined to patches here and there. He mentions that a dressing of caustic lime, soot, or gas lime, is very beneficial, accompanied by deep trenching of the ground. When plants are seen to be attacked they should be at once removed and burned to destroy the larvæ, as they seldom arrive at a useful state afterwards. As soon as they are cleared off, the ground should be treated as above described. Mr. Philip Hannam, of Northbourne Court, Deal, also mentions lime as a very good preventive, and recommends "liming the ground to be planted with Swedes during the previous winter, not later than the end of January if possible." In the district round Isleworth, where Cabbage is one of the chief crops of the neighbourhood, this Weevil is

in some years excessively prevalent, so that heaps of many cart-loads of old Cabbage-stalks may be seen flung aside when the fields are cleared, all more or less covered with the Galls in various stages,

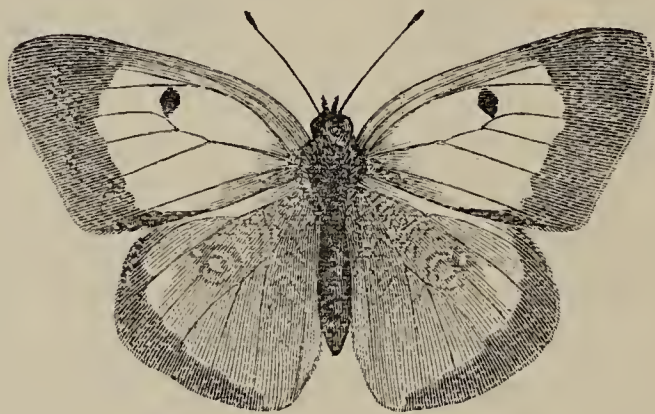


CEUTORHYNCHUS SULCICOLLIS.

some still with maggots contained in them. These maggots have great powers of endurance: on being removed from the Gall, even if not fully grown, they will at once construct earth-cases as if ready for pupation; and in the cold weather of last winter, out of a large number that I examined (with one exception), all were alive and healthy; and on being thawed after removal from the Gall and placed on soft earth they made their way into it and formed their earth-cases as usual. The numbers of this Weevil are much increased by the custom of merely throwing the old Cabbage-stumps, with still tenanted Galls in them, aside, instead of burning them; and where the stumps in this state have been buried to decay a little below the surface, and a fresh Cabbage crop planted above, the result has been very bad.

Phædon betulæ. Mr. D'Urban notes that he has received specimens of this Beetle from Mr. J. G. Burgess, of Magdalen, near Lynn, Norfolk, with details of the method of its attack on the White Mustard in the Fen country, where many promising crops that would yield five or six sacks of seed per acre are destroyed by this pest. It is mentioned as appearing generally about the flowering time, and first to attack the leaves, then the bark of the stem and branches, and finally to gnaw the pods till the seeds are visible. The seed in these cases is always small and grey, and almost unsaleable, not paying the

expenses of harvesting. The Beetles are noted as appearing first on the Mustard, but will also attack young Rape, and Mangolds in full leaf when growing near infested Mustard plants. A specimen of Mustard was forwarded, showing the eggs had been deposited in slits in the leaves close to the main ribs, and many holes had been eaten in the substance of the leaf by the perfect insects. Mr. Burgess mentions that in a dry season he has never observed these Beetles, but in showery weather they are very destructive, and at harvesting time may be found in almost incredible quantities on the crop. A severe storm of rain and hail appears to have been in this case the most efficacious remedy, though rather unfortunately neutralising the effect of a careful series of experiments as to the effects of various applications. In the Cabbage-growing district round Isleworth it is considered that fresh hops from the brewery are a very good means of keeping off the ordinary Turnip Fly, and the application might possibly have a good effect on the allied Chrysomelideous Beetle, *P. betulae*.



COLIAS EDUSA.

Colias Edusa. Clouded Yellow Butterfly. Mr. Norgate mentions seeing a female on September 3rd at Brockenhurst, in the New Forest; and at Tangley, Guildford, it is mentioned as "scarce as usual." At Maldon a single much-worn specimen was seen by Mr. Fitch on September 26th. Mr. E. Parfitt mentions not having seen and only having heard of one specimen near Exeter this season. At Sedbury Park, West Gloucestershire, however, the Clouded Yellow is reported as having been seen in some numbers about September 29th, and the particulars forwarded, on special enquiry being made, left no doubt as to its having been this Butterfly. This observation of the continuance in the neighbourhood is of some interest, for in 1859 there was a sudden appearance of the *Colias Edusa* in such great numbers on one Clover field, at Sedbury Park, that I might have taken them readily in dozens; and although the Butterfly was very rare (or, I believe, unknown in the neighbourhood previously), I saw

it afterwards there for several years, The climate is soft and mild, and the ground a tongue of much-wooded land, about three-quarters of a mile wide, lying between the Severn and Wye, about 150 feet above the medium tide-level.

Liparis auriflua. Yellow-tail Moth. Mr. Dobson mentions the larvæ being very common at New Malden, Surrey, about July 6th, and the moths at the end of August. These larvæ are occasionally very destructive, especially to Whitethorn; and in 1782 were so excessively and generally injurious that (see Stephens's 'Entomology,' vol. ii. p. 66) orders were issued for prayers to be read in all the churches to avert their ravages. In the present case their appearance is coincident with excessively wet weather, as Mr. Dobson notes that from June 1st to July 27th there were not two dry days consecutively.

Aphides—taken generally—seem to have varied much in amount of appearance in different localities. Mr. Malcolm Dunn mentions that the first insect attack of note occurred about June 20th, when myriads of *Aphides* made their appearance on Apple, Pear, and Peach trees. They quickly over-ran the young growths, injuring the wood, and crumpling the leaves so as to cause them to fall. The fruit on the Pears and Peaches, being already of some size, suffered no material injury; Apples, on the contrary, were in many instances still in full flower, and the *Aphides* attacking the blossoms caused them to fall off prematurely, to the severe injury, and, in many cases, the entire loss, of the crop. In a very few days (three or four at the most) of favourable weather these pests did an immense amount of injury, attacking most of the plants that they affect in vast numbers; but a heavy night's rain swept all that were exposed to it entirely away, and the cold wet weather of July prevented those left doing much harm during the rest of the season. Some trees, and especially Beech, suffered severely during this outbreak of *Aphides*, some parts of Beech hedges in the district being so badly injured that they lost their leaves, and will probably succumb to the attack. Mr. Dunn observes that for an attack on a scale of such magnitude there is no practicable cure; but for plants of a moderate size, in the open air, syringing with diluted tobacco liquor or strong soapsuds is generally a very effective and most commonly-used remedy. Mr. Mosley, writing from Huddersfield, mentions that *Aphides* have been exceedingly numerous on almost everything; and at Addington, Bucks, Mr. Matheson notices the Green Fly as having been most troublesome on Plum and other trees. He also mentions the prevalence of a white *Aphis* on the roots of vegetables to such an extent as nearly to destroy some of the crops, such as Lettuce and some kinds of Cabbage. The Green Fly is also observed

as being unusually numerous at Aber Camlais, near Brecon. At Maldon, Essex, Mr. Fitch notices the remarkable absence of all species of *Aphides*.

Sawflies of Scots Fir and Alder. Mr. John McGregor, Ladywell, Dunkeld, mentions that the larvæ of a Sawfly (probably a species of *Lophyrus*) have been very injurious for the last three seasons on Scots Fir trees in a young plantation of two thousand acres, devouring enormous quantities of the foliage, and thereby doing much harm to the trees. On such an extent of ground it seems almost hopeless to think of applying a remedy; but on a small plantation of twenty acres, not within five miles distance of any other Scots Fir wood, an attempt was made to clear the trees, which has been so far successful. The plan adopted was to send a number of boys through the plantation, each furnished with a small vessel containing naphtha and a brush roughly made of feathers, with which the clusters of larvæ were slightly sprinkled or touched, when they immediately fell down; and by this means the plantation was almost cleared. Of the Alder Sawfly Mr. Edward Parfitt observes that it has been more numerous along the banks of the Exe than he has seen it for many years, and a large number of the trees have been completely defoliated by it.

With regard to the Insectivora I am favoured by Mr. F. Norgate, of Sparham, near Norwich (who has devoted particular attention to this subject), with valuable detailed observations, from which I give the following notes:—

Amongst various species of Birds serviceable generally on Forest trees, Apple trees, and Fruit bushes, Mr. Norgate mentions the Titmice, including the Blue, Cole, Marsh, Long-tailed, and Great Tit (and of these the Blue Tit may be especially observed at work amongst *Aphides* on Gooseberry bushes); also the Warblers, Woodpeckers, Nuthatch, and Tree-creepers. The Lesser Spotted Woodpecker is noted as especially frequenting the Apple; the Gold-crested Regulus frequents the Scotch Pine, Spruce, and other *Coniferae*; the Bearded Tit, Yellow Wagtail, Titlark, Wren, Cuckoo, and Water Rail, are mentioned as serviceable in Osier beds and Reeds, and in Marsh Hay. Amongst Gooseberry, Currant and Raspberry bushes the Titmice and Warblers, the Wren and the Cuckoo, are noticed as of especial use. Amongst Cabbage and Turnip crops the Partridge, Spotted Flycatcher, Swifts, Swallows, and Martins, are serviceable (and also Shrew-mice, Moles, if not too injurious to agricultural work, and Bats). On Grass—besides the Warblers, Swallow, Swifts, Martins, and Partridges, before mentioned—the Wagtails, Pipits and Starlings were all of

service; and the Shrews and Bats, the Slow-worm and the Toad, help at the work. The Cuckoo is of especial service from not refusing hairy larvæ, and the Flycatcher as destroying the white butterflies; whilst Bats eat the moths of the surface caterpillars (Noctuæ of various species), and Shrews prey on beetles.

Some degree of discrimination is desirable in encouragement of Birds, as with regard to Starlings, which are noted as injurious to Reeds; and Rooks, again, which at times do damage in various ways; but, generally speaking, the encouragement of the Insectivora, whether Bird, Beast, or Reptile, would make a very important difference in the amount of insect presence.

I now offer a few remarks with regard to such of the Insects as are now first mentioned on the accompanying sheet.

It is almost impossible to give a description in words (unaccompanied by coloured figures or comparison with other specimens) by which the species of an insect may be known with certainty, but, agriculturally, it is usually the attack taken as a whole, not the various species of insects engaged, that is the important matter; and from this point of view the attackers are generally only too well known. Entomologically, such terms as the "Fly," the "Grub," &c., are not satisfactory, but, nevertheless, they embody the description of the cause of the attack truly, and sufficiently fully for practical purposes, for where all the insects concerned are of the same habits, do the same damage, and are to be got under in the same way, it is not necessary for the agriculturist to endeavour to distinguish each species.

If more information be needed—and where the insect is not known it is of great importance to be rightly informed on the matter—it is far better that specimens should be sent for naming. Any applications on this subject directed to Mr. Preston, Mr. Fitch, or myself, would be attended to with pleasure; and I only wish we were favoured with specimens more frequently; but the prevalent idea that something of Entomology must be understood to enable an observer to note how the insect injury is to be counteracted is a great mistake, and loses us many a valuable note. If the observer will send a specimen in case he does not know what it is, this is all the scientific Entomology with which he need trouble himself: he knows the practical part of how it feeds on his crops only too well; and it is the detail of this injury, the amount of loss sustained, or how it has been prevented or stopped, that we are anxious to have information of, and to spread the knowledge generally.

The insects named on the list are selected, as far as possible, as being the most injurious of the genus; but in one or two cases a species which is not widely distributed has been taken that we might have the advantage of an illustration showing a type of the genus. For these excellent illustrations we are, as before, indebted to the kindness of Dr. Masters, in allowing us the use of electros from the blocks belonging to the 'Gardener's Chronicle,' taken from the drawings of Prof. Westwood and the late Mr. John Curtis.

1. *Plusia Gamma*. Silver Y Moth. About an inch and a half across the wings when spread; the head and body purplish brown the former with the plumage raised so as to form a crest; the upper wings silky, and mottled with various shades of pinkish and brown, with a pale yellow or whitish mark on each wing, like the Greek γ ; the lower wings smoky. The caterpillar, when full grown, is about an inch and a quarter long, green, with six white or bluish lines down the back, and a yellow line along each side. It spins the cocoon in which it changes on some part of a plant.

4. *Agriotes lineatus*. The Striped Click Beetle, or Wireworm Beetle. This may be known from the (also very common) *Agriotes obscurus* by having the wing-cases striped with alternately dark and light lines of brown, and rust or ash-colour. In *A. obscurus* the wing-cases are reddish brown or dusty black. The Click Beetles may be recognised by their shape, as given in fig. 4; also by their power of regaining their right position when laid on the back by giving a sudden spring accompanied by a loud click; and the true Wireworms are larvæ of these Beetles, but from their likeness to other "pests" some confusion exists very often on this subject. The true Wireworms are yellow or orange, almost cylindrical, shiny, and so hard that it is difficult to crush them, and altogether are remarkably like a piece of yellow wire. They are distinguishable from Centipedes and Millepedes by having only six legs placed in pairs on the three segments immediately behind the head, and have also one sucker leg at the tail. From the Crane Fly grub, which bears the name of Wireworm very generally in Scotland, they are distinguishable by *having* legs; the Crane Fly grub has *none*.

10. *Aphis rumicis*. Collier; Black Dolphin; Black Fly (Scottice). The well-known black *Aphis* of the Beans, commonly named from its sooty colour. The males with four wings, slightly tinged with brown, and with brown nerves; the females wingless, with ochreous legs.

13. *Agrotis segetum*. Turnip Moth, or Common Dart Moth. This is from an inch and three-quarters to two inches in the spread of the wings, and very variable in colour; the fore wings are freckled with

brown, with two waved lines at the base, a double waved line beyond the middle, and a still more irregular one at the edge of the wing, accompanied by various oval or ear-shaped spots of various depth of tint, and other markings too complicated for a short description. If the Moth is not certainly known it is best to forward it. The caterpillars grow to about two inches in length, and the thickness of a small goose quill, and are of a freckled ochreous colour with a broad space, often rosy down the back, bearing a double dark line with a fainter one on each side, and two black dots placed on each segment between these lines; the first segment behind the head is brown, divided by three pale lines. The caterpillar is of a shining horny appearance, and on disturbance rolls itself up.

14. *Phyllotreta undulata*. Turnip Fly. The Turnip Fly, or Turnip Flea Beetle, is only too well known. Of the many species *P. undulata* and *P. nemorum* appear to be the most destructive. Both species are striped on the wing-cases, and distinguishable from each other by the fact of *P. nemorum* being the largest, the most coarsely punctured, and having yellow shanks.

16. *Aphis Rapæ*. Turnip Aphis, or Turnip Plant Louse; Blue Fly (Scottice). Females wingless, green, with a shagreened surface. Males four-winged; wings with light brown nerves; colour ochreous, or (taken in detail) green mottled with ochre and black.

20. *Aphis granaria*. Wheat Plant Louse. Females often wingless; green, with green and black legs. Males four-winged; the upper wings with a long green streak near the front edge. These *Aphides* change after death to a brown or ochre-olive colour.

21. *Cossus ligniperda*. Goat Moth; Ogger or Augur Worm (Scottice). About three inches in expanse; fore wings rich brown, varied and mottled with darker markings, crossing the wings in waved lines; the hinder wings somewhat similarly marked, but of a dull pale brown. The caterpillar is flesh-coloured in its early stage, with a black head, and broad dull red stripe down the back; the colouring becomes more definitely red on the back and orange at the sides as the caterpillar gets towards full growth, when it is as much as three to four inches in length. It is distinguishable by the disagreeable smell from which the Moth takes its name.

22. *Zeuzera Æsculi*. Leopard Moth. About two inches and a half in expanse of the wings, which are semitransparent; fore wings whitish, with many blue-black spots; hind wings with spots less distinct; thorax whitish, with six large black spots; body grey. The caterpillar is yellowish, with glossy black spots.

23. *Bombyx neustria*. Lackey Moth. This is about an inch and

a half in expanse, and very variable in appearance; the fore wings sometimes red-brown, with two pale transverse bars, or yellow with dark brown bars; the hind wings red-brown, generally paler than the fore wings, with a faint bar across the middle. The caterpillar is gregarious, and very gaudily marked; the head and second segment blue-grey, the first with two eye-like spots, the second with four black spots; all the other segments are striped throughout; a central white line runs down the back, and on each side of this are successively a thin black line, then in stripes, orange-red, black spotted with blue, orange (narrow and interrupted), broad blue, orange dotted with black; and below the caterpillar is blue-grey dotted with black. The eggs are laid in rings on the Apple shoots; and the caterpillars cause much damage by spinning up the leaves and young shoots in their webs.

24. *Yponomeuta padellus*. Small Ermine Moth. This little Moth, which averages about three-quarters of an inch in the expanse of the wings, is extremely variable, the ground colour of the fore wings being sometimes white, sometimes pale or deep lead-colour; each fore wing has about thirty minute black dots on it, placed in three slightly-irregular rows; the hind wings are lead-colour. The caterpillar is of a dirty ash colour, spotted with black.

26. *Anthonomus pomorum*. Apple Weevil. The Beetles are hardly a quarter of an inch in length, and pear-shaped; reddish brown, with short whitish or ochreous hairs. These minute Weevils come out from their winter shelter in March, when the blossom-buds of the Apple are swelling, and in some years materially injure the crop by laying their eggs in the buds, so as to prevent their future development into fruit. The males fly, but the females usually crawl along the bough; and probably much might be done towards checking them in the Orchards of the cider-growing counties, where they are the most injurious, by removing ragged bark, and the enormous masses of Lichens, Mosses, and other shelters for insect vermin, which in many parts of the West of England are allowed to accumulate on the trees.

27. *Eriocampa adumbrata*. Pear Tree Slug-worm. The perfect insect is a Sawfly; black with a violet tinge, and with blackish wings. The larvæ are easily distinguishable by their shape, which (as shown in the figure) is so much swollen behind the head as almost to conceal it; and also by the bottle-green or black grubs being coated with slimy adhesive matter, giving them a truly disgusting appearance during their early life. When they are about five weeks old they cast their skins, and appear wrinkled transversely instead of being wet and slimy, and of an ochre-colour instead of black or bottle-green. The

number of synonyms for the common Slug-worm, and also the doubts as to whether two species do not really pass under one name, make the subject rather difficult; but the above description will convey the general appearance of the larva, sometimes so injurious to the Pear leaves.

28. *Nematus Ribesii*. Gooseberry and Currant Sawfly; Gooseberry Caterpillar. This Sawfly is ochreous, with an orange-coloured body; the wings iridescent, with brown nervures. The larvæ, when about three-quarters of an inch long, are dull pale green, with the segments next to the head and tail of a deep yellow; head, feet and tail black, and black spots on each segment, sometimes arranged in rows down the back. When full grown the caterpillars cast their skins, and appear of a uniform pale green, and still with the yellow segments, but without the black spots, excepting two little black dots on the head. They go down into the earth to change, and spin a yellow-coloured cocoon, as previously mentioned, from which the summer brood hatches in about three weeks; but the autumnal brood lies unchanged, buried in the cocoons in the earth till the following spring, when they develop as the Gooseberries and Currants come into leaf.

30. *Retinia Turionana*. Pine-bud Tortrix. This moth is somewhat under an inch in the expanse of the wings; the fore wings bright orange, with several irregular or bifid transverse silvery streaks; the hind wings dusky lead-colour. The larva is glossy, of a dark purplish brown; the head, and transverse patch on the second segment, black. When full fed it turns to pupa in the Pine-bud, on which it has been feeding. Various species of Pine-bud Tortrix are injurious to Pines, and remedies found to be of practical use would be of great value. The species named is sometimes injurious in England, but not generally so much so as other species of *Retinia*; it is selected that we might have the advantage of the figure of a type of the genus, and its method of injury.

31. *Hylobius Abietis*. Fir Weevil. A pitchy black Weevil, about half an inch in length, mottled with irregular wavy bands of downy yellow on the upper surface, and so much rounded at the sides as to be almost cylindrical. This Beetle is furnished with a long thick proboscis, and thence occasionally bears the name of Elephant Beetle.

32. *Hylurgus Piniperda*. Pine Beetle. This minute Beetle is only from one to two lines long; black, slightly downy, with pitchy legs, and dull red antennæ.

It now remains for me to express my hope that those who have hitherto assisted will continue their contributions for the next year's

Report. The subject is one of great importance to the country, and can only be met by well-grounded practical measures; what these measures are we can only tell from the experience of those who have carried them on in the different methods required by different soils, weather, and surroundings. It has been said we want statistics of the amount of loss from insect injury. It is hardly possible to give these disconnected from other points; but for those who wish to follow up the subject there is much information as to the amount of destruction our injurious insects are capable of, and the extent and amount of loss by special attacks, in the earlier volumes of the 'Journal of the Royal Agricultural Society,' in the 'Transactions of the Entomological Society,' and occasional notes in the reports of the crops in the 'Gardener's Chronicle and Agricultural Gazette.'

Those interested practically in the subject do not need information, but to the outside observer the reflection that "the crop had to be resown" means that the labourer's wages, cost of use of horses and implements, and cost of seed, were thrown away, besides many incidental expenses, including, in some cases, a certain amount for rent of land that has made no return, will give some general idea of the loss (or the proportion in which in lesser attacks it is to be calculated) per acre. If we look at the notes in this Report there is scarcely one observer who does not record definite loss; and this is hardly as one in a million to the amount which, in the aggregate, makes up what has this year been lost to the country at large.

Many of those whose constant occupation keeps them from studying what is needed, and who find that the regularly stated remedy for the attack frequently fails them from want of adaptation to their particular circumstances, would be happy to benefit by the advance in knowledge of the last few years as to remedies tried and proved to be of service in different soils and different agricultural and climatal circumstances, and would probably in return make their own experience known if they had the opportunity.

Any notes or communications will be received with pleasure, as before, by the Rev. T. A. PRESTON, Marlborough; E. A. FITCH, Esq., Maldon, Essex; or by myself, at Dunster Lodge, near Isleworth; and any information wished for will be gladly given as far as it may be in our power.

E. A. ORMEROD, F.M.S.

DUNSTER LODGE, NEAR ISLEWORTH.

December 19th, 1879.

